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WARREN DE LA RUE, Vice-President, in the Chair.

J. M. Eustace, Esq., Wimbledon;
J. E. H. Peyton, Esq., 63 Chester Square;
W. Garnett, Esq., Bashall Lodge, Clitheroe;
Capt. J. Williams, Aberdeen; and
Lieut. H. F. Yeatman, R.N., Sherborne, Dorset,

were balloted for and duly elected Fellows of the Society.

On the Eye-piece for Correction of Atmospheric Dispersion.
By G. B. Airy, Astronomer Royal.

In a late Number of the *Monthly Notices*, I showed that the effect of atmospheric dispersion on the images of celestial objects viewed at small elevations (to which I may add, the chromatic separation produced by slight error in the centering of the lenses of an object-glass), might be corrected by the insertion of a prism of proper angle in the eye-piece. It was obviously an inconvenience, though a very trifling one, that a battery of different prisms must be prepared for different elevations of the object viewed; and it would be better, if possible, to avoid the insertion of an additional piece of glass.

Mr. William Simms pointed out to me that a prism of adjustable angle would be produced by causing the convexity of a plano-convex lens to roll in the concavity of a plano-concave lens,

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the radii of curvature of the convex and concave surfaces being equal. This construction would relieve the first of the inconveniences which I have mentioned, but would aggravate the second.

After various suggestions, Mr. W. Simms and myself arrived, independently and simultaneously, at a construction which, for simplicity and optical perfection, is not likely to be improved. It consists merely in making the eye-glass (supposed to be plano-convex) broader than is strictly necessary for the telescopic vision, causing it to press by its convex surface into a concave cup at the eye-end of the eye-piece, and allowing it to roll in that concavity; thus presenting different parts of its convex surface, though always in the same form and position, to the rays of light which come from the field-glass, but presenting to the eye a plane

Fig 1.

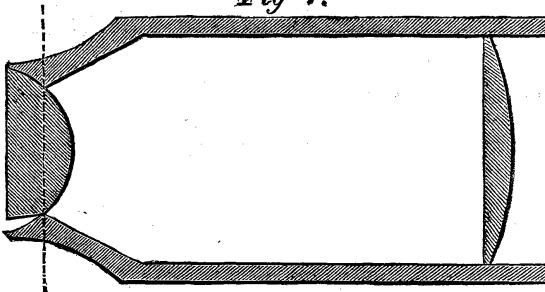
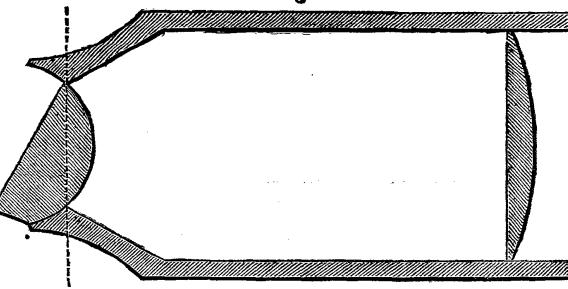


Fig 2.



surface, which, in one position of the lens, is normal to the telescope-axis, and, in another position of the lens, is inclined to it.

The above diagrams will explain the optical action of such an eye-piece.

Fig. 1 shows the position of the lens in the state for ordinary use.

Fig. 2 shows its position when atmospheric dispersion, &c., are to be corrected.

It will be seen that, in each case, the dotted line separates, on the telescope-side, a plano-convex lens of definite form; but that, in the first case, there is applied to it on the eye-side a piece of glass bounded by two parallel surfaces; and in the second

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case, there is applied to it a prism, whose angle is gradually varied by gradually varying the position of the lens in its cup.

I have represented the large eye-lens as incomplete towards the lower edge. Optically, no injury is produced by making it complete ; but I thought it possible that the projection of the lens edge might be inconvenient to the observer's eye ; and also that the bluff termination of the lens might be convenient for the application of screw-motion.

The eye-piece in this state presents these advantages : it introduces no additional glass ; it allows the use of a prism with angle gradually changing ; and it does not disturb the corrections for spherical aberration.

It seems not too much to say that every telescope intended for delicate purposes might advantageously be furnished with such an eye-piece.

The eye-piece must have a swivel or rotatory motion round the axis of the telescope. A very simple screw arrangement, in a specimen eye-piece furnished to me by Mr. Simms, appears to place the eye-glass entirely under command.

1869, Dec. 20.

Seventh Catalogue of Double Stars, observed at Slough, in the years 1823–1828 inclusive, with the 20-feet reflector ; 84 of which have not been previously described. By Sir J. F. W. Herschel, Bt. F.R.A.S. (Abstract.)

The observations of double stars herewith submitted to the Royal Astronomical Society were made in the course of my earlier sweeps at Slough, with the 20-feet reflector, and would have been included in the third of those Catalogues of double and triple stars observed with that instrument which the Society has already honoured with a place in its Transactions, but for a two-fold reason, viz., that that Catalogue was limited, 1st, to stars not before (to my knowledge) observed as double ; and 2ndly, to the completion of a first exact thousand of such objects ; thus causing the exclusion of 84, which are here entered as Nos. 5450–5533, and which in the subsequent redaction of Catalogues 4, 5, and 6, would appear to have escaped entry, owing to non-advertence to this circumstance. The remainder of the present list is made up, for the most part, of stars included in Struve's Dorpat Catalogue, and recognised as such. Although the angles of position of these latter stars are given only from careful estimation, they are not without some considerable historical value, inasmuch as in a great many instances they are antecedent in point of date to any recorded measurements, and in several are the only existing records of position ; and though in some particular cases widely erroneous, they yet present for the most part such an agreement with subsequent micrometrical measures as in the earlier stages of this branch of astronomy would have ren-